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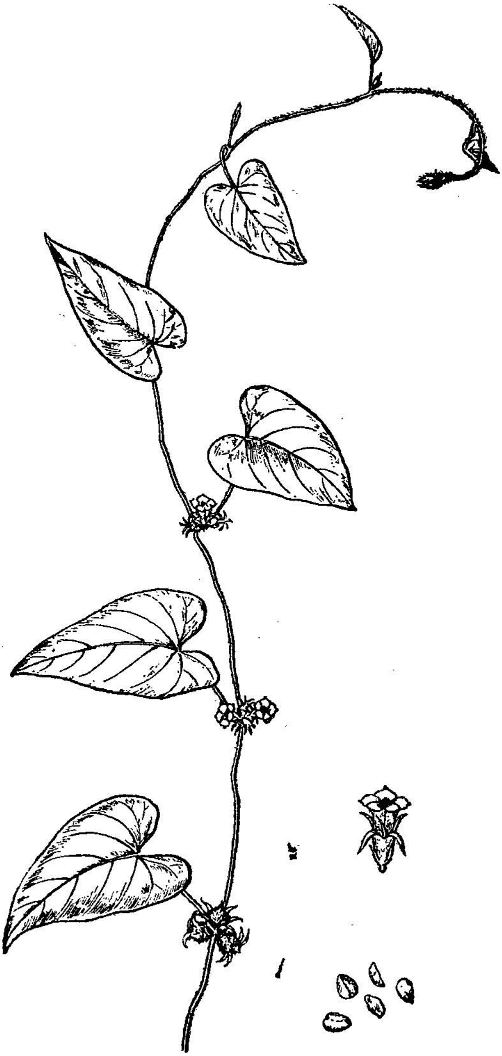
EDITORIAL

Radio and Agriculture. The improvement of the lot of the peasantry is always a matter of great concern to those interested in agriculture. The Government had already introduced two beneficial measures of importance, i. e. Debt Relief Bill and the Prohibition Act which are calculated to give the peasantry a chance of better living in the long run. But we teel that something more can be done to enliven the peasant in his dreariness. Perhaps a word of solace or a word of cheer when given in just the time when he is in doubt and difficulty may go a long way in bettering his lot. It is here the "Akash-Vani" or the Radio could step in and accomplish what was not possible a few years ago. In the west where Radio has considerably advanced heart to heart talk is broad-casted to the peasants far and wide in specified periods, called the 'Farmers' hours.' In these talks information, on various subjects having a bearing on rustic life is given. With the establishment of more broadcasting centres in South India and the Government committed to the programme of installing the radio sets in select important villages it should be possible to benefit the ryot on similar lines. We understand that the Director of Agriculture is already on the move to institute a series of talks on agriculture. It is hoped that these and similar talks from the other sister departments will prove useful to the tiller of the soil.

The Public Health Bill. The passing of the Public Health Bill must be considered a step forward in awakening the Sanitary consciousness of masses It aims at improving the sanitary conditions of the village life with which the peasant is intimately associated. Hereafter the villager will be assured of a protected water supply by the Public bodies and consequently the danger in the shape of outbreaks of epidemics arising out of pollutions will be considerably reduced. This and other provisions of the Act are intended to improve the lot of the villager but a good deal of propaganda will be necessary to prepare the minds of the masses to accept the changes which are meant for their good.



Ipomea hispida Roem & Sch.

Ipomaea hispida, Roem. and Sch., A Useful Fodder Weed*

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In response to the campaign against waste initiated by Mr. S. V. Ramamurti, I. C. S., Director of Agriculture, Madras, in December 1932, as part of a programme of utilising things noxious which can be made useful on a farm, a study was undertaken at Coimbatore to utilise the weed *Ipomaea hispida*, Roem. and Sch.

When growing horsegram *(Dolichos biflorus*, Linn.) this Ipomaea weed was found to be present in large numbers, growing more vigorous, leafy and drought resistant, covering the ground more fully and forming patches of fresh and green clusters in the midst of the drying horsegram crop. Horsegram is essentially a pulse of the famine country. It thrives well in sandy loams and in areas subject to drought. The presence of this vigorous weed naturally attracted attention. Seeds were gathered and a small crop was raised. It was not long before it was recognised that in this weed we had a good drought resistant fodder.

Ipomaea hispida is a slender, twining, annual, distributed throughout India ; stems clothed with hairs : leaves alternate, $1\frac{3}{4}''$ to $3''$ by $\frac{3}{4}''$ to $1\frac{1}{2}''$, ovate or ovate-oblong, acute, often apiculate, more or less hairy on both surfaces and with hairy margins, base cordate with rounded lobes ; petiole $1''$ long, densely hairy. Flowers 1—3 (rarely more in a head); peduncles very short, under quarter inch long : bracts $\frac{1}{6}''$—$\frac{1}{4}''$ long, linear, hairy ; pedicels very short. Sepals scarcely enlarged in fruit, very hairy, rather less than $\frac{1}{2}''$ long, acuminulate from an ovate base, the outer sepals broader than the inner. Corolla $\frac{1}{2}''$ long, companulate, pink, pubescent in the upper part with small tufts of hairs at the apices of the small acute lobes. Ovary densely hairy. Capsules $\frac{1}{2}''$—$\frac{1}{3}''$ in diameter, globose, hairy. Seeds glabrous, minutely pitted.

An enquiry was instituted about the occurrence of this weed in horsegram fields in other parts of the presidency and the following interesting information was obtained.

In many parts of the presidency this weed occurs in association with horsegram ; naturally the seeds of the former get mixed up with that of the latter at harvest time. This is known as *Kolikada*, *Palakada* and *Kollaganjeru* in the Telugu districts. In the Guntur district and in the *lankas*

* Paper presented to the 26th Session of the Indian Science Congress, Agricultural Section, Lahore, January 1939.

(islands in the river with thick deposit of silt) of the Kistna river, it is sometimes grown as a pure crop or mixed with horsegram and sorghum for fodder in small patches of about half an acre per pair of animals. The seed rate is about 20 lb. per acre. As a green feed for milch cattle it is highly valued. The Agricultural Demonstrator, Guntur, reported an instance in which a ten cent plot of this fodder plant was leased for Rs. 2 and fed green for one month to a she-buffalo at 20 lb. per day with a resultant increase in milk production. This crop is harvested in February and March. The weed is said to suffer from excessive rain. In the red loams of the Coimbatore district under rainfed conditions 3000 lb. may be cut as green feed and in the heavy black cotton soils of the Bellary district, a cut of 3000 to 3,700 lb. may be obtained. In the black soils of the Guntur tract which has a better distribution of rainfall, yields up to 4000 lb. per acre are recorded.

This was tried at Pattambi in the Malabar district along with horsegram and cowpea (*Vigna catjang,* Endl.). It was recorded that this Ipomaea was found to have a thick growth with tendrils trailing on the ground. Though the crop suffered in the north-east monsoon rains it rallied with the coming in of the dry weather. Ipomaea gave a forage yield of 7,962 lb. per acre as against 7,441 lb. of cowpea and 6,247 lb. of horsegram. One decided advantage noted in plots that had Ipomaea is that weeds were completely smothered and the plots were comparatively clean. As a mixture with teosinte, sorghum, or maize, the vines of this weed will have full facilities to grow and give a good cut along with the cereal forage. Its thick matted growth is a great help in making it a useful cover crop to check run-off water and soil erosion.

As in the case of horsegram the threshing of this crop has to be done by cattle. The *bhusa* (dried leaves, husk etc., left after the seeds are removed) is a useful by-product. The *bhusa* of horsegram has also proved a cattle feed. Two and a half pounds in the morning and two and a half lb. in the evening were fed to cattle continuously for three days and the animals relished it leaving very little behind. The seeds of this weed were kibbled and fed to cattle. They licked it up with avidity.

Fresh vines with flowers were analysed and found to be free from hydrocyanic acid. An analysis of a sun-dried sample of this fodder cut at the flowering stage was kindly made by the Government Agricultural Chemist. His findings are given below.

Heads of Analyses.	*Lab. No. 353/32—33.*
1. Original moisture	16·13
2. Ash	10·01
3. Crude protein	15·56
4. Ether extratives	2·40
5. Crude fibre	20·78
6. Carbohydrates	35·12
Total	100·00

7.	Insolubles......	1·21
8.	Albuminoids	11·80
9.	Soluble mineral matter ...	8·88
10.	Starch equivalent	71·50
11.	Nutritive ratio	1 : 2·56
12.	Iodine	Nil
13.	Nitrogen	2·49
14.	Phosphoric acid	0·55
15.	Potash	3·05
16.	Lime	1·62

Remarks. The sample of Ipomaea weed is a rich food containing 11·8% albuminoids and 35% carbohydrates. It is rich in ash having about 3% potash and 1·62% lime. It is as good as sunnhemp.

When the crop was ripe the seeds were gathered and the Government Agricultural Chemist kindly analysed the same and found it to be as follows :—

	Heads of Analyses.	*Lab. No. 476/32—33.*
		%
1.	Moisture	9·22
2.	Crude protein	22·25
3.	Ether extratives	9·52
4.	Ash	3·94
5.	Crude fibre	10·63
6.	Carbohydrates	44·44
	Total	100·00
7.	Albuminoids	19·69
8.	Sand	0·11
9.	Soluble Ash	3·83
10.	HCN (hydrocyanic acid) ...	Nil

Remarks. The seed of Ipomea resembles the pulses in protein content; but it is much higher in fat, and free from hydrocyanic acid. In my opinion it will make an excellent food stuff.

From the above facts it will be noticed that in this hardy weed we have a fodder of high quality whose seeds are also rich in food value. The thick matting of this crop ought to make it a useful preventive of soil wash. This weed deserves greater attention and wider trial.

Summary. *Ipomaea hispida,* Roem. and Sch. is a weed commonly occurring in fields of horsegram (*Dolichos biflorus,* Linn.) This weed has proved to be a valuable fodder plant that is drought resistant. Cattle relish the fodder. The vines and seeds, on analyses show to be rich in fodder and food value. Acre yields up to 4000 lb. could be obtained. A botanical description of the weed is given. Its utility against soil wash is indicated. This weed deserves greater attention and a wider trial.

The Buffalo in the Madras Presidency.

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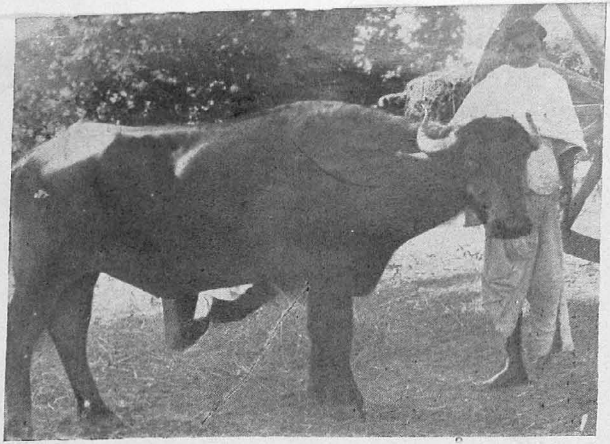
While aiming at the improvement of livestock in this presidency, the production of suitable work-cattle is an important point to be kept in mind more than anything else. Different localities do require different kinds of work-cattle according to the environmental conditions, such as, soil, climate, rainfall, availability of water and nature of work they are required to do. In some areas, bullocks are more suited for draught purposes than buffaloes while under certain conditions, the buffaloes are more essential for draught purpose, as bullocks cannot perform the work equally efficiently. For instance, in the wet-land tracts of North Vizagapatam, East and West Godavary districts, Krishna, Trichinopoly, Tanjore, Tinnevelly and the West Coast districts (Malabar and South Kanara) the buffalo is more efficient and economic than the bullock in the main operations of puddling and levelling, not to speak of the cane crushing work and carting where these are required to be done. The buffalo as a draught animal, therefore, deserves in this Presidency, as much attention as the bullock, if not more; in as much as it is already established and approved of, that the she-buffalo is the common dairy animal for India by virtue of her high milk-yielding capacity and considerably greater content of fat in her milk than that of the cow. Though the buffalo plays such an important part in the economics of this presidency both as a draught and milch animal, it has not received as much attention as it should, in the matter of selection or evolution of suitable breeds or improving the local breed or breeds.

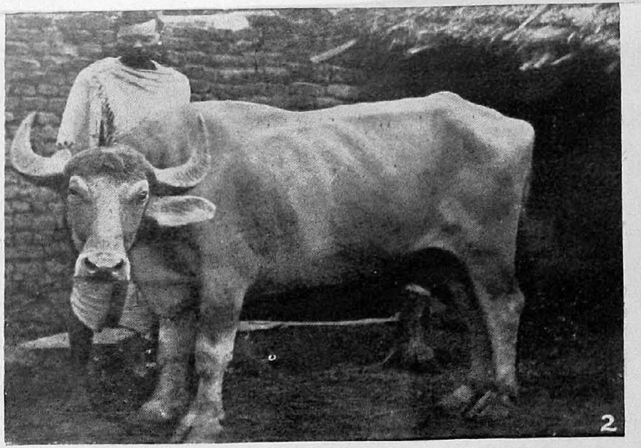
At present, what we find everywhere in this Presidency, is the *desi* or local buffalo. Even though in different tracts of this Presidency, the local buffalo is termed commonly as the *desi* buffalo the animals of one locality do not seem to possess the same characters as those of another locality. In fact, there is much variation in certain common features of an animal of one locality from those of an animal of other parts. In some tracts, the *desi* buffaloes go under the name of the tract itself, such as Guntur breed, Cuddapah breed, West-coast breed etc.

During the last two or three decades, four breeds of buffaloes from northern India and Central Provinces, have crept into this presidency, especially into the Northern Circars (excepting Guntur) chief of which being the Somabalpur-breed. These breeds are found to be superior to and more useful than the local from both work and dairy points of view, and as such, they are replacing the *desi* breed in the Northern Circars to a large extent, chiefly for draught purposes.

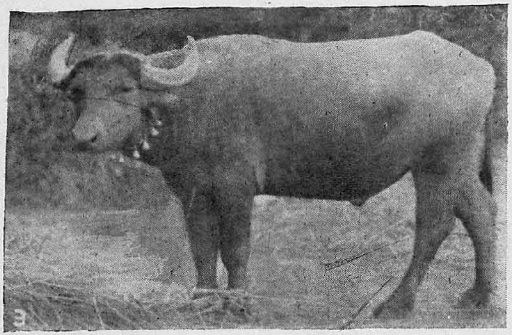
The following are some details regarding the chief characters and points of utility of these breeds. There are four chief breeds of buffaloes



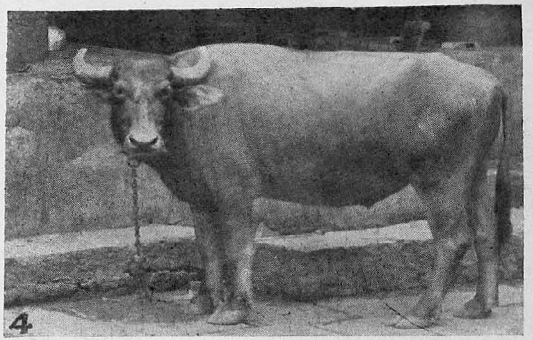
Sombulpur.



Kalahandi.



Manda.



Zerangi.

that have come down from the North viz. (1) Sombalpur, (2) Kalahandi (3) Manda and (4) Zerangi.

The Sombalpur Breed. The Sombalpur buffalo is also termed as Gowdoo-buffalo or Kimedi buffalo. Its chief habitat is round about Bilaspur in the Central Provinces. Yearling calves are brought to the Sambalpur Agency in herds by *Gowdoo* (cowherds) where they are reared and sold to the dealers in Sambalpur, who take them annually to Vizagapatam, East and West Godavary, especially in the beginning of the south west monsoon.

Animals of this breed are dark in colour with a long barrel and of a huge size with short curved horns, bending backwards, running up and sloping forwards at the tip, thus forming a semi-circular appearance. This breed differs slightly from the famous Delhi-breed, in its long narrow barrel, elongated nose, flat fore-head and somewhat narrow horns. Generally, the neck of the animals of this breed becomes narrow after castration in greater proportion than that of the other animals and the front portion of the body is not well developed. This animal possesses considerably thinner skin in the majority of cases, when compared with other breeds; and it is more active and swifter in pacing. Its tail is narrow and long with a white tuft. Though the colour of the animal is generally black, brownish and ashy-grey animals are also occasionally met with. The length of an average male animal at the age of 4 to $4\frac{1}{2}$ years is 72 to 75 inches from crown to croup when the neck is not stretched, and the girth behind the hump is 90 inches.

The Sambalpur buffalo is not only famous for his heavy draught purpose, but also for his swift pacing on both slushy and hard soils alike, which quality is generally wanting in the other breeds. He prefers waterlogged places and marshy grounds both for roaming, grazing as well as for work. In places of heavy rain-fall, he thrives best and on rainy days he is found to graze better. This animal cannot withstand the hot sun, and in summer, it does not move out from the stalls between about 9 a. m. and 4 p. m. In this respect, this breed may be said to be more delicate than the other breeds and *desi* buffaloes. The animals are exceptionally docile for their huge size. and even young boys can control them. They require frequent dipping in water at least twice or thrice a day.

Sombalpur buffaloes are particularly useful for wet land operations and in deep slushy soils. they work with considerable ease. In the heavy delta soils of East and West Godavary. these are specially useful. The peculiarity with these is, that the animal maintains a uniform quick pacing even in slushy soils, with the heavy load of a *holla* or land-leveller. Being strong and sturdy creatures, they withstand the strain of hard work in puddling to a greater length of time than others, hence they are more economical for such work. Even for crushing sugarcane, these animals are found more useful specially on account of uniform swift pacing and capacity for working continuously for a longer period without getting exhausted unlike other animals. The writer found by trial, that two pairs of these could crush in five

hours, as much cane as three pairs of local buffaloes in the same period by turns. A pair of these animals can easily draw a load of 1,500 lbs. in a cart, and fare better than other kinds of buffaloes on sandy soils or slushy surfaces.

Of all the four breeds named above, this animal appears to be the best milker. I had experience with a stock of about 120 animals of this breed for nearly five years. Out of 70 she-buffaloes I selected a dozen good milkers, whose yields were recorded, to be 5,000 to 6,000 lbs. per head in a lactation period of 340 to 370 days, with a daily average of over 16 lbs. while the few best yielded 25 to 35 lbs. per day during the first quarter of their lactation period with moderate feed. I should think that under improved feeding, carefully bred and selected she-buffaloes should give considerably more yields.

Besides the good qualities enumerated above, this buffalo may be said to possess the advantages of being a regular breeder. Out of a herd of 70 she-buffaloes in the estate-farm of Parlakimedi, over 63 used to be served in October—November every year, and about 55 used to calve in the next August—September.

Animals of this breed require somewhat more care and better feeding than those of other breeds. But, they are certainly worthy of the extreme care and cost, being economical in the long run, in many aspects. The cost of feeding per pair per day is Re. 0—7—0 to 0—8—0.

Kalahandi Breed. This animal is named after its habitat in the "Kalahandi Samasthanam" of the Central Provinces. It is born and bred up in the Agency tracts of the above state and leads its life on the hills, and hence is much hardier than others. A few animals are annually brought down to Vizagapatam and occasionally to Godavari Districts for sale.

The animal, though also of a huge size, is short-barrelled when compared with the Sombalpur breed. The general colour is grey or ashy-grey, the fore-head being a little protruded. The horns are broad and half curved, running backwards and bending forward at the tip slightly and are broader and longer than those of a Sombalpur breed. The neck and front portion of the body are well developed with strong fore legs. The eyes are prominent and big with a narrow red margin around the eye-lids. The chest is large and well developed as in the Kangayams of the bovine cattle. The bony structure and ribs are very strong and enable the animal to take the strain even under heavy loads of any kind. The tuft of the tail is white generally, and the flanks are flat and broad.

The animal is a hard working docile creature but in the young stages appears to be timid. It withstands the sun and heat to a much greater extent than the Sombalpur and gets easily acclimatized to any locality. It feeds on the hardiest stuff, and is therefore an economical feeder when compared with Sombalpurs. It can graze on hard coarse grasses unlike the Sombalpur animal. Being much hardier, it does not require so much of

bathing and special attention as the Sombalpur animal. It is fit for a greater variety of conditions and localities.

The animal is specially suited for carting timber from the top of the hills to the plains, and for dragging heavy loads up-hill through rough roads on steep gradients with considerable ease and swiftness. He has a special knack of fixing its foot firm on the ground avoiding slipping on the steep inclines, or when about to slip down, to crawl on its knees for a few yards and getting up again.

In addition to possessing such special qualities for cart work on the hills, he is an equally suitable animal for work in the plains, both for puddling in wet lands and for sugarcane crushing. Though the animal is not so swift in his pacing as the Sombalpur in slushy soils, yet he works continuously for long periods without getting exhausted. He also withstands the sun better than other breeds and therefore is well suited even for dry tracts. The writer has not had much of personal experience with she-buffaloes of this type, but learns that the animal is not so good a milker as a Sombalpur, though a regular breeder and better milker than the local *Desi*-buffalo.

Manda Breed. Animals of this breed are brought down from the hills, bordering the Central Provinces towards the East. The animals are largely found in the hills between Central Provinces and Old Ganjam, especially Parlakimidi and Mandasa Agencies.

The manda buffalo is a medium sized animal smaller than the above types. It may be said, to be of the same size as a well developed *desi* buffalo. This breed is reared in the thick forest areas, and brought down to the plains for sale in large herds and hence the name manda (herd) buffalo.

The general colour of the animal is brown or grey. The horns are broader and running backwards exactly like the *desi* buffalo's horns, in a semi-circular way. The eyes are sharp with a broad red margin around the lids. The nostrils and jaws are wide and more prominent than those of other buffaloes. It is sometimes ill-tempered before arriving in the plains, but later on, it gets fairly docile. The fore legs are stout and short, and the chest is well-developed, the neck also being short and stout. The nose is very short with a flat fore-head and there is an arch-like curved red ring around the chest about 3 inches wide. The collar bones and ribs are very stout for its size. The fet locks and front knees have yellow rings of hair, and the tuft of the tail is yellowish white unlike those of any other buffalo. The size of a 6 teeth animal (male) is as follows: Length from crown to croup 65 inches, girth 77 inches and height 52 inches.

The manda is a hardier animal than the Sombalpur and withstands the sun like a bullock. In short, this has got all the qualities of a Kalahandi animal, though to a less degree. It can manage with limited feed, and grazes on hard pasture. It is more economical to maintain a pair of these, than in the case of Sombalpur or Kalahandi, considering the amount of

work turned out, with reference to the expense of maintenance, or in other words greater amount of work can be extracted with less cost by owning these buffaloes. The cost of feeding per pair per day works up to Re. 0—4—6.

The manda buffalo is useful for all agricultural operations, being moderately swift, and drawing heavy loads in much greater proportion to its size. It gets easily acclimatized to any locality and thrives well under varied conditions. It is nick-named in the agencies as *Bolodo-pudo*, (bullock-buffalo), due to its being capable of doing hard work in the hot sun, as a bullock does, for a great length of time. Its usefulness for carting stones, timber and other heavy loads is a special feature of this breed. It can draw a load of about half a ton even in country tracts, though at a slow pace. The milk yield is said to be the same as that of a good *desi* buffalo.

Zerangi Breed. This breed is found in the agencies of Zerangi hills in the old Ganjam agency, and hence the name. It is the smallest of the buffaloes, even much smaller than the *desi* buffalo, but a swift runner and more energetic than others for its size.

The Zirangi is a black-coloured small animal, not exceeding $3\frac{1}{2}$ to $3\frac{3}{4}$ feet in height, with a short barrel. The animal has short nose and small cut-horns running backwards like those of a small sized *desi* buffalo. The tail is peculiarly thin and short, about $1\frac{1}{2}$ feet long being cut away in the early stages. The hooves have a slight slender cut in the middle, and appear almost like unseparated ones. The skin is considerably thinner than that of other buffaloes which is indicative of its activity and swift running.

Being habituated to live in the midst of wild beasts this animal gets frightened and alarmed at the slightest noise. The hooting of a motor car or a bus scares the animals and the cart may even be upset but with a nose string and head-rope it can be easily brought under control after 2 or 3 months' training. On account of their swift running and small size, they are sometimes called 'deer-buffaloes' in the hills of Zerangi and Parlakumidi agency. They withstand the heat only to a certain extent.

The Zerangi buffaloes are very useful for the wet-lands with light soils, such as those of the west-coast districts. It is their natural habit to go swiftly while ploughing and carting. For their size they draw heavy loads and are generally considered hardy animals. They are more suitable for the plough, than for the cart though a pair can easily drag a load of 1,000 lbs. in a cart.

Being a small animal, the Zerangi buffalo can manage with considerably less quantity of feed, and may be said to be the most economical feeder for the amount of work turned out. The cost of a pair would be from Rs. 60 to 70, according to size, and a poor cultivator can maintain these with much advantage on account of their low price, small maintenance charges, and useful service. These are not, however, found very useful for cane crushing work, as the Sombalpurs, though some pairs are seen to work very satisfactorily at a poor man's small cane mill.

At present these are found only in the northern taluks of Vizagapatam district and west of Ganjam and have not yet been taken to other parts. The writer has no experience of the female stock, but it is reported that the she-buffalo of this breed is just as good a milker as the *desi* buffalo.

The writer has attempted in this article to briefly describe the good and bad points of four existing breeds with the hope that an attempt will be made to select suitable animals and to establish a foundation herd for future breeding.

Tobacco Stems as a Useful Source of Nicotine for Insecticidal Purposes

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Introduction. The study of insecticides and their toxic action on various harmful insects forms one of the many important items of the work of the Entomological Section. It has always been its endeavour to explore the possibilities of finding cheap and efficient insecticides the cost of which would be well within the means of an average ryot to meet. The authors' chief object in writing up this short paper is to focus attention on the possibilities of tobacco stems being used successfully as a source of nicotine for ordinary spraying purposes against some of our orchard and vegetable pests.

Nicotine and its sources. To an entomologist the value of tobacco lies in its high nicotine content. Nicotine is an alkaloid that is formed during the fermentation process in the tobacco leaves ; it is distributed in various parts of the plant, i. e., leaves, stalks and stems in varying proportions. Leaves contain the maximum ; the stalks and stems have it in very small proportions. Various types of tobacco have varying nicotine content. The leaves of the local tobacco popularly known *Yerumai Padaku* has been found to contain as high as 6·08% of nicotine against 3·26% in Virginian types like Harrison's Special. The use of high grade tobacco leaves as a source of nicotine is out of question as it can never be a commercial success in spraying operations.

Action of Nicotine. Nicotine is a very powerful toxic agent ; it is a fumigant and owes its success to its power to paralyse the nerve centres by entering the spiracles of the insects on which it is sprayed and bring about their death ultimately. It is never used at the full strength but is always diluted either with water or dust to carry a known percent. Western countries have been rigidly insisting that the final spraying fluid should contain not less than 0·05% to 0·1% to obtain satisfactory results. But our trials show that lower strengths of nicotine can be recommended to give the same measure of success.

Nicotine of the market. Pure nicotine 98% is available in liquid form and is imported from foreign countries at Rs. 18 to 21 per lb. Besides, there are proprietary dusts containing 3 to 4 percent nicotine. Nicotine sul. phate is another liquid containing about 40% nicotine available at Rs. 4/8 per lb. All these are exceedingly costly to be recommended for use by Indian ryots.

Tobacco stems. It is the usual practice to use tobacco waste for spraying purposes. Now, we find that tobacco stems could be used for the same purpose at less cost. It is estimated that an acre crop of tobacco might give about 400 lbs. of stems which are either wasted away or burnt as fuel or dumped into the manure pit by ryots. But seldom are the stems used as a source of nicotine. The useful alkaloid in it is thus totally lost. On a rough estimate 400 lbs. stems will be able to give enough nicotine to make up about 1200 gallons of spraying fluid of the required strength. This quantity should be sufficient to treat a 12 acre chilli crop against thrips or tobacco against plant lice. Ordinarily, a ryot is known to spend Rs. 6 per acre to get the requisite tobacco waste. It is presumed that with the use of stems instead these charges could be reduced much to the advantage of the ryot.

Water Extracts of tobacco stems. Three different water extracts were made. One was a cold infusion prepared by soaking one pound of chopped stems in one gallon of rain water overnight and draining it after 12 hours of soaking. The other two are hot infusions; one prepared by boiling one pound of the stuff for 15 minutes and the other for one hour. All these extracts were finally made upto one gallon and tested at various dilutions against aphis and thrips; a small quantity of soap $\frac{1}{4}$ oz. to one gallon was always added to increase its wetting powers.

Tobacco Stems Infusions and their analyses for nicotine. Through the kindness of the Government Agricultural Chemist and his staff, it was possible to get the stems of the local tobacco and the water extracts analysed for their nicotine contents. From Table I which gives the analysis of tobacco stems and their water extracts, it will be seen that rain and tap water extracts have given more or less similar nicotine values; further, with the lapse of time, i. e. four months, a decrease in the nicotine values is noticeable which may be due to a spontaneous, slow loss of nicotine from the stems under storage conditions.

Toxicity trials. Toxicity trials were made on *Aphis gossypii* Gl. to test the toxic values of the extracts at various dilutions. All the three above extracts were sprayed at the original strengths and at dilutions of 1:1, 1:2, 1:3 on the aphis under field conditions and mortality counts were taken nearly six hours after the spraying. It was found (Table II) that the cold and one hour boiled extracts gave 97 to 100 per cent kill even in the lowest dilutions tried. This incidentally indicates that nicotine, at as low strengths as 0·018, is quite efficacious against the plant lice and higher

nicotine content is not essential. It is interesting to find that long boiling for one hour gives increased nicotine values in the extracts over those boiled for less time.

TABLE I. Analysis of tobacco stems and their water extracts for nicotine.

Date of analysis.	Nature of water used.	Cold infusion	Hot infusion		Tobacco stems used for preparing infusions.
		1 lb. soaked in 1 gl. water overnight for 12 hours.	1 lb. immersed in 1 gl. of simmering water for 15 mts.	1 lb. boiled in 1 gl. of simmering water for one hour.	
		grams in 100 cc. Sol.	grams in 100 cc. Sol.	grams in 100 cc. Sol.	
31—3—1938	Rain water	0·086	0·055	0·070	0·1433
4—8—1938	Rain water	0·051	0·043	0·047	not done
	Tap water	0·051	0·039	0·051	...

TABLE II.

Toxicity trials of tobacco stems infusions against *Aphis gossypii* Gl. made on 29-3-38.

Strength of solution	Mortality of Aphis*				Nicotine values per cent		
	Cold infusion	Hot infusion boiled for 15 minutes	Hot infusion boiled for one hour	Control (water)	Cold infusion	Boiled for 15 minutes	Boiled for one hour.
Stock solution	100%	98·1%	100%	7%	0·086	0·055	0·070
1:1	98·1%	97·2%	100%	—	0·043	0·027	0·035
1:2	100%	94·4%	95·2%	—	0·028	0·018	0·023
1:3	100%	42·1%	99·8%	—	0·021	0·013	0·018

* Includes the values for the moribund as well.

Similar trials were made against the chillies leaf curling thrips *Scirtothrips dorsalis* Hd. using only the cold extract, in December 1938. The aqueous infusions were found to be highly toxic in dilutions of 1:2 and a decrease in toxicity was noted when the dilution was raised to 1:3. As in the previous case, the counts were taken six hours after the spraying was done and the results so obtained are given below:

Stock solution	(0·051% nicotine)	gave 97·2%	mortality.
1:1	(0·025% „)	„ 90·2%	„
1:2	(0·017% „)	„ 97·1%	„
1:3	(0·013% „)	„ 65·9%	„

The aqueous extract, even at dilutions of 1:3 was found to be very effective against the ragi root aphis *Tetraneura hirsuta* B, the lab-lab aphis *Aphis medicagenis* K and the brinjal aphis.

Analysis of the various varieties. In view of the possible increase in the use of tobacco and its products in the insecticidal sprays, it was felt necessary to know which of the varieties grown in this Presidency gives the maximum nicotine value. This information might be useful in selecting the type with a high nicotine content, for growing on a large scale, when the need should arise in the future for an extensive cultivation of tobacco for insecticidal purposes.

The leaf samples from the current year's produce were obtained through the help of the Assistant Directors of Agriculture and were kindly analysed for their nicotine content by the Government Agricultural Chemist. The analysis as furnished by the Chemist is given below. It will be seen that the *Yerumai Padaku* grown at the Central Farm records the highest percentage of 6·08% as against 1·851% of *Javari* from Bellary. Between the two range the values of other tobacco.

TABLE III.

Results of analysis of 17 samples of tobacco leaves for their nicotine content.

Serial Number.	Variety.	Source.	Nicotine value in per cent.
1.	Yerumai Padaku	Central Farm	6·080
2.	Kanuvakkarai	Avanashi	4·906
3.	Dakshinadi	Guntur	4·290
4.	'Oosikappal' for chewing	Bhavani	4·183
5.	Perumathai (for chewing)	Do.	3·753
6.	For chewing and beedi	Hospet	3·734
7.	For chewing	Dindigul	3·409
8.	Harrison Special	Guntur	3·206
9.	'Oosikappal'	Coimbatore	3·109
10.	For chewing and snuff	Siruguppa	2·868
11.	—	Adoni	2·850
12.	Snuff tobacco	Dindigul	2·746
13.	'Local' (sun cured)	Guntur	2·672
14.	'Cheroot'	Dindigul	2·672
15.	'Lanka' for cigar	Rajahmundry	2·221
16.	'Oosicappal' (for country cigars)	Bhavani	2·147
17.	Javari	Bellary	1·851

Acknowledgments. The authors' thanks are due to the various Assistant Directors of Agriculture for help in sending tobacco samples and to the Government Agricultural Chemist for kindly getting the analysis done.

Bridging the Gulf.

BY G. MAHADEVAN, B. Sc. (Ag.)

I have chosen rather an enigmatical title for my paper from the cue given by Sir John Russell in his Report on Indian Agriculture. This latest document prepared at the instance of our Agricultural Viceroy practically ends with this phrase, making everybody who goes through the report to think furiously as how best to bridge the gulf between the research station and the ryot over waters of the conservatism of the Indian agriculturist.

Several reports on Indian agriculture have paid high tributes to our research sections. Our research on agricultural problems and their useful solutions thereon can compare favourably with what is done elsewhere. Yet the Indian ryot has not derived the benefit and continues to be the poorest in the World. Here then is the enigma ; our research is of a high order and the Indian peasant for whom all this research is intended is none the better off in the World and has barely "an anna and seven pies income per day". This is the gulf that exists between ourselves and the objects at which we aim. We find we have better agricultural knowledge to impart to the ryot, but at the same time we see that the ryot is not taking up our suggestions for improvement.

There are several reasons for the existence of the gulf. And it has ever been the feature of several reports on Indian agriculture to number them in the order of importance. The chief reason attributed in one and all of them is the conservatism of the ryot. The peasant is proverbially conservative all the World over. And there is nothing special in the Indian peasant being conservative. The man who tills the soil and makes a living by the hard manual labour feels chary to adopt any method which is reported to be an improvement over his time-honoured practice, whether he be the poor Indian peasant or the innocent Chinese cultivator, the shrewd Japanese agriculturist, the proud German tiller of the soil or the clever English yeoman. They are all conservative. To every one of them it is positive risk to change one's time-honoured practice. Still there does not seem to be the same big gulf which we have before us in India. Solutions offered by the research stations in the European countries particularly are more easily adopted by the peasants of those countries than our own Indian peasants. Sir John Russell's report explains this contrast at length. If in Europe one of the research stations discovers a method which is an improvement over the time-honoured method it is followed by the European agriculturist comparatively quickly and without even the inducement from the Government of the country. Here in India such ordinary things as the Cotton Pest Act requires years of propaganda before it is brought into practice. This is a peculiarly baffling affair which gives room for people to talk of the existence of the gulf between the research station and the ryot.

Sir John Russell attributed this slowness and sometimes positive refusal on the part of the Indian peasant to adopt better methods of agriculture to the lack of cultured classes taking to agriculture as a profession. This he is not tired of repeating at every stage of his report. A cultured man has better discrimination. And when he takes to agriculture as a profession even though he be surrounded by peasants who are conservative, he, with the power to discriminate, follows the method that stands to reason. Naturally his neighbours who are less cultured than himself closely observe his methods and eventually get convinced about the superiority of the same. The custodians of the culture of society have got to be also the promoters of the better agriculture of the land if there is to be an improvement of Indian agriculture. If a few cultured people could be induced to take to agriculture as a profession this gulf between the research station and ryot would narrow down and eventually disappear. If the problem of inducing the cultured classes to settle down on the land is solved there is good chance for Indian agriculture to forge ahead.

Let us then consider the variety of material available for bridging this gulf. Tried and tested material is certainly the best for any construction. On a close analogy it might appear that people who have gained considerable experience in Indian agriculture while in the department are the best people to settle down on land and successfully practise agriculture and be the beacon lights for others to follow. This apparently seems to be the best method of solving the problem. As many, if not all the members of the Agricultural Department should settle down in villages and put into practice the improved methods of agriculture and show their worth. That the retired officers of the department should settle down in the villages seems to be apparently most reasonable. If they are ill suited for this kind of work by reason of their age and moreover the change-over in the normal life that it will entail is sure to make them go off the bearings. They will in fact be misfits. We must naturally think of some other agency to take up the bridging.

There are certainly some exceptions to this general trend of things concerning retired people. In our own province Rao Bahadur Ramaswami Sivan is now busy with his Chidambaram colonization scheme. We want gentlemen of this type to lead us. And it should be the duty of the Government to help such schemes and encourage retired gentlemen to come forward and lead the younger generation. Let us also wish that more and more retired gentlemen will come forward with schemes like this. Perhaps young gentlemen in service could undertake this. I raise this point most cautiously. I very well remember the vehement protest that was raised by the officers in service when we discussed this problem in a debate in this college. The proposition was that "Agricultural Officers after 5 years service in the Department should be made to settle down on the land". Of course the students then had a motive in supporting this proposal as it gave them a hope to have a footing in the Department soon after graduation. But I do not see anything seriously wrong with the proposal. If this be the

case why should they object to practising it themselves. This is one of the strongest arguments advanced by the Indian ryot before accepting any methods suggested by the Department. There is a feeling that, if the much talked of improved methods of agriculture could be successfully demonstrated by the officers themselves in the lands on which they settle, much of the apathy of the ryot for the improved methods would vanish. He will get more interested in them and slowly adopt them.

Gentlemen might remark that this is all an idealistic talk carrying no practical suggestions. Let me give a few instances. Supposing one of our specialists, say, the Oilseeds Specialist evolves a certain strain of groundnut and would have us all believe that it gives an increased return of say Rs. 12—8—0 per acre to the cultivator the Government resolves to ask this Specialist to settle down on a piece of land extending in area which when multiplied by the enhanced return per acre will equal his salary the Specialist can easily take up the challenge and prove that his statements are true to fact. He should be able to substantiate his claims, if, in lieu of his monthly salary he were allotted as much of land to cultivate as would give him an amount equal to his annual salary based on the increase in yield.

Some gentlemen with an alarmist tendency might say that this is all positively risky to resign a job and settle down on land. At least I know one instance personally where an officer of the Department is much better off as an agriculturist in Scotland than as a Deputy Director of Agriculture. You might have known of several more instances and the proposition that agricultural officers after a few years service should settle down on land is not so bad as certain gentlemen would have it represented. And if a few of our agricultural officers should actually do so it will effectively answer some of the critics who do not have much• of faith in the sayings of the Department.

Lastly, we come to the agricultural graduate as the material for bridging the gulf. He is about the freshest material we can think of. The new graduate is eminently fitted to take up to private farming but unfortunately he has not been trained to that frame of mind. As a result, we are not able to secure his services in this direction.

The chief reasons that dissuade agricultural graduates from taking to private farming are that his parents and elders frighten him about the risk involved and they had looked upon his education as the safest means to secure a job after graduation. It is a sad feature that he is unable to get the job he had hoped to get and finds himself thrown out of gear. At present a lot of talent is simply running to waste. It is hoped that in course of time the young graduates may veer round and develop a frame of mind conducive to private farming and take it up for making his living. Then are the chances more bright for the closing down of the gulf that now exists.

If at this stage I might be permitted to join my young friends I would ask one and all of them to think whether the practical training we receive

and the outlook on life we acquire in colleges like ours are only mere qualifications to secure jobs. Surely they are worth much more. It is the way with our elders to frighten us with things which they themselves dare not face. But we are all young men with plenty of warm blood in us and it is unbecoming of us to talk of risk and all such silly things when the whole country is marching forward constructing one bridge after another. We, as the best material for bridging this gulf of rural conservatism, shall not lag behind any others in the service of our country and humanity at large. I would appeal to my young friends to take to private farming, come what may, and be leaders of agriculture of our country. As I make this appeal I am conscious of the fact that I am asking my young friends to choose a rugged and steep path to climb the hill. It is certainly a hard life to be a private farmer. But you can always be proud of choosing the right path. It is true we have not received any encouragement from the Government in the past as I might testify in my own case. But now the whole thing is changed. We are now having a popular Government with the broadest vision and the most sympathetic outlook. It is up to us to take the best advantage and serve the country in bridging this gulf between the research station and the ryot.

To sum up in conclusion all that has been discussed in this short paper the most serious problem in the development of Indian agriculture is the gulf that exists between the scientific knowledge and the applicability of the same by the Indian ryot who continues to be the poorest in the World. The one way of solving this problem according to the best authority and for the most convincing reasons is that cultured people ought to take to agriculture as a profession as the only means of overcoming the conservatism of the ryot and forming the bridge between himself and the culture he had attained. Old and retired people are generally no good at this. But there are a few unique exceptions and it shall be the duty of every one of us to wish them all success and make our Government to help and support these gentlemen. People in service who could undertake this are certainly very good material and every attempt must be made to induce as many of them to settle down on the land and put into practice what they have been advocating. The finest material however is the agricultural graduate who deserves better encouragement both from our elders as well as from the Government. These are some of my humble suggestions in the construction of this bridge over the gulf of the conservatism of the Indian ryot.

EXTRACT

Hydroponics or the systematised raising of crop and ornamental plants in water culture is the subject of an interesting article by C. T. Greeves-Carpenter in the January number of *Scientific American*. The plant physiologist and the research worker have long been familiar with the technique of growing plants in nutrient solutions in the absence of soil, but their efforts have been solely confined to the laboratory. The adaptation by Dr. W. F. Gericke of the Univeristy of California of this method has transformed it from an experimental curiosity to a commercial proposition. Nor need horticultural enthusiasts working in city offices and living in tiny flats any longer envy their suburban colleagues their freshly fragrant button holes, for hydroponics offers " a fascinating means of achieving their objective in a small space such as on window sill, or where there is a lack of soil as would be the case in the limited confines of a roof." Under the system, the nutrient solution is contained in tanks of wood, concrete or asphalt coated iron. A tank 2′×6′×½′ will conveniently hold about 25 gallons of solution. An asphalt painted " mattress " of wire mesh (1″ for small plants and 2″ for larger ones) are stretched on fixed uprights at a height of 3″ above the surface of the nutrient solution and a layer of straw is spread thereon. The top layer is made up of fine inert material like sawdust, pine shavings etc. The thickness of the bed of litter and sawdust is determined by the nature of the plant to be grown thereon. When plants are to be raised from seed a 2″ layer of litter will suffice; the bed is moistened with water, the seeds are broadcast and lightly covered. When cuttings, seedlings or bulbs are transplanted a 3″ to 4″ depth of bed is desirable. All plants, seedlings, etc., should have their roots down the litter and wire mesh so that they are immersed in the nutrient solution. It is important to see that a constant level of the nutrient solution is maintained in the tank. Frequent aeration of the solution is necessary. It is also advisable to change the solution at least once a fortnight. The composition of the nutrient solution is such as to supply all the elements required for proper plant growth, and accordingly varies from plant to plant. Other factors like the acidity or alkalinity of the water used, climatic conditions etc. have also to be considered. The author gives some formulae and also full instruction for preparing the various nutrient solutions.

It is not however claimed that hydroponics produces better plants or larger yields than those grown under favourable soil conditions.

Gleanings.

A new milking process. A new milking process, in which air is excluded from all steps, all the way from cow to bottle, has been invented by Burgess A. Lee of Lockport, N. Y., working in collaboration with Professor Oscar Frif., of the Ohio State University. Milk obtained by this process is claimed to be protected against losses of calcium and vitamins that occur when the fresh-drawn milk is exposed to air.

Milk as it comes from the cow's udder contains two gases in solution, nitrogen and carbon dioxide. Contact with oxygen is stated to cause precipitation of calcium salts and loss of vitamin constituents. This loss, according to Professor Frif, is responsible for the failure of pail-fed calves to thrive as well as their udder-fed companions. Exposure of milk to air is aggravated in the cooling process of present dairy practice, where it is flowed openly in a thin sheet over chilled pipes. (*Science* Vol. 88 No. 2287, October 28, 1938.)

A new Synthetic Fiber. Chemistry has created a new synthetic fiber from coal, water and air, which has the strength of steel coupled with the fineness and beauty of silk, it is announced by the F. I. du Pont de Nemours and Company. The new fiber, claimed to be one of the greatest achievements of industrial research, is expected to be the rival of natural silk in its last remaining stronghold of usefulness—the hosiery trade. Nylon is the new material from which the new fiber is made. It is basically different from familiar rayon in that it does not require cellulose for its production.

Chemically the nylon fibers are polyamides. Like natural silk they have a protein like structure. Filaments finer than silk or rayon can be spun. The filaments have amazing elastic recovery and great strength. These properties plus the ability of the fibers to take common dyes easily, forecast the chemists goal of making sheer, two-thread hosiery with the wearing characterstics of the four-thread, service-weight variety.

But hosiery is not the only application of the new nylon fiber. Because its diameter can be controlled at will it can be produced for a variety of products like brush bristles, racquet strings, fishing lines, woven dress goods, velvets, knitted and woven underwear. It can also be employed as a transparent wrapping film, for plastic compositions, textile finishing agents and coated fabrics. Tooth-brushes with the synthetic bristles are already on the market. (*Science*, Vol 88, No. 2288, November 4, 1938).

New Wood Preservative. Pentachlorophenol, now produced on a commercial scale, has been found to be a particularly effective material for the treatment of wood for preserving it against decay, termites, and other destructive forces. It may be applied as a 5 per cent solution of a petroleum solvent, preferably by pressure impregnation or by brush treatment. The advantage of the new chemical as compared with creosote and other familar materials is that it does not change the texture or painting properties of the wood and possesses practically no odor. It can be used for treating heavy timbers or for the preservation of finished mill work. Although it is difficultly soluble in water, it forms a compound of sodium which is readily soluble and can be used for controlling slime and algae in industrial water supplies and as a preservative for glue and other similar materials subject to decomposition by bacteria or fungi. D. H. K. (*Scientific American*, January 1939)

New Insecticides. British research on chemicals for the control of pests has revealed the fact that several unusual compounds ordinarily used for other purposes possess merit for controlling insects. Tetramethylthiuram sulfide, a valuable accelerator in rubber vulcanization, repels the Japanese beetle. Methyl bromide has been found to be even more toxic than hydrocyanic acid for several types of moths and larvae and is being used effectively against granary weevils. Phenol thiazine is being studied as a substitute for lead arsenate. Dichloroethyl ether, used as a solvent in refining petroleum, has been found effective in killing the wire worm.—D. H. K. (*Scientific American* January 1939)

Death Ray for Insects. Cold-Blooded inhabitants of the fur of dogs and cats, of birds and their cages, lofts, and coops—fleas, ticks, lice, red mites—now have their own private death ray. A new infra-red lamp, developed by the Leray Corporation, kills all such vermin and others which infest seeds, cloth, wood, and other materials. Fungus is also said to be susceptible to its killing rays, so that plants may be freed of disease fungi.

At present most of the emphasis on the killing power of this light is being placed on its use to rid household pets of vermin. Abercrombie and Fitch Company, New York sporting goods store, advise that they are daily making

very satisfactory demonstrations on dogs that are brought into the store. One treatment, naturally, is not sufficient to eradicate all vermin on an animal. The reason for this is not that all pests on the pet do not succumb at once but because the vermin often leave their "hosts" for short periods, especially after they have eaten well and are sleepy. The pet is therefore used as a lure or trap to facilitate cleaning of its quarters.

The Leray lamp is as easy to operate as a flashlight. It is held close to the animal's body, while the operator's other hand ruffles the fur so that the light will penetrate to the skin. That is all there is to it except that often it is necessary to accustom the animal to its presence by flashing it on for several short periods. Death to vermin at any particular spot comes in from a fraction of a second to four or five seconds. (*Scientific American*, January 1939.)

Crop and Trade Reports.

Paddy—1938-39—Final forecast report. The average of the areas under paddy in the Madras Province during the five years ending 1936-37 has represented 14·5 per cent of the total area under paddy in India.

The area sown with paddy in 1938-39 is estimated at 9,943,000 acres as against 10,043,000 acres for the corresponding period of the previous year and the finally recorded area of 10,140,831 acres in 1937-38. The present estimate falls short of the final area of the previous year by 2 per cent and of the area of 10,200,160 acres in a normal year by 2·5 per cent.

963 000 acres have been reported as sown since the last December forecast was issued. The extent so sown was large in the South (326,000 acres), the Carnatic (200,000 acres), East Godavari (100,000 acres), Anantapur (65,000 acres), Vizagapatam (60,000 acres) and Chittoor (56,000 acres). The area sown in December and January was less than that sown in the corresponding period of the previous year by 485,000 acres or by 33 5 per cent.

The area under second crop paddy is expected to be below normal owing to the failure of the North-East monsoon rains.

The harvest of the main crop of paddy is in progress.

The crop was damaged by the cyclone in November in the districts of East Godavari, West Godavari and Kistna. The crop was also adversely affected by the failure of the North-East monsoon rains in the other important paddy growing districts.

The yield is expected to be normal in Bellary and Anantapur and below normal in the other districts. The yield is estimated to be only 50 per cent. of the normal in Chingleput and South Arcot, 60 per cent. in West Godavari and 75 per cent. in North Arcot and Ramnad. The seasonal factor for the presidency works out to 82 per cent. of the average as against 96 per cent. in the Season and Crop Report of the previous year. On this basis, the yield works out to 81,145,000 cwts. of cleaned rice. This represents a decrease of 15,851,000 cwt. of cleaned rice or 16·3 per cent. when compared with the estimate of 96,996,000 cwts. of cleaned rice in the Season and Crop Report of the previous year. The yield in an average year is estimated at 102,007,000 cwts. of cleaned rice.

The wholesale price of paddy, second sort, per imperial maund of 82⅖ lbs. or 3,200 tolas as reported from important markets on 6th February 1939 was Rs. 3--6—0 in Vellore, Rs. 2—12—0 in Chittoor, Rs. 2—10—0 in Tinnevelly, Rs. 2—9—0 in Virudhunagar, Rs. 2—6—0 in Vizianagaram and Madura, Rs 2—5—0 in Rajahmundry and Trichinopoly, Rs. 2—4—0 in Ellore, Bezwada, Masulipatam,

and Guntur, Rs. 2—2—0 in Cocanada and Cuddalore, Rs. 2—1—0 in Hindupur and Conjeeveram, Rs. 2—0—0 in Kumbakonam and Anantapur, Rs. 1—15—0 in Mangalore and Rs. 1—14—0 in Negapatam. When compared with the prices published in the last report, i. e., those which prevailed on 9th January 1939, the prices reveal a rise of 7 per cent. in Anantapur, 3 per cent. in Hindupur and 2 per cent. in Tinnevelly and a fall of 17 per cent. in Madura, 14 per cent. in Kumbakonam and Negapatam, 12 per cent. in Trichinopoly, 11 per cent. in Cuddalore, 8 per cent. in Conjeeveram, 5 per cent. in Virudhunagar, 3 per cent. in Guntur and 2 per cent. in Chittoor, the prices remaining stationary in the other markets.

Crop – Gingelly—1938–39—Intermediate report. Sowings of late gingelly are in progress in most districts and the germination is fairly good.

The wholesale price of gingelly per imperial maund of 82$\frac{2}{7}$ lbs. (equivalent to 3,200 tolas) as reported from important markets on 6th February 1939 was Rs. 6—11—0 in Tinnevelly, Rs. 6—9—0 in Trichinopoly, Rs. 6—3—0 in Cuddalore, Rs. 6—1—0 in Salem, Rs. 5—15—0 in Rajahmundry, Rs 5—12—0 in Cocanada, Rs. 5—9—0 in Ellore, Rs. 5—2—0 in Vizianagaram and Tuticorin and Rs. 5 in Vizagapatam. When compared with the prices published in the last report, i. e., those which prevailed on 9th January 1939, these prices reveal a rise of approximately 4 per cent. in Rajahmundry and Cuddalore and 1 per cent. in Tinnevelly and a fall of approximately 5 per cent. in Vizagapatam, 4 per cent. in Cocanada and 3 per cent. in Trichinopoly, the prices remaining stationary in Vizianagaram, Ellore, Salem and Tuticorin.

Sugarcane—1938—Third or final report.—The average of the areas under sugarcane in the Madras Province during the five years ending 1936-37 has represented 3 2 per cent of the total area under sugarcane in India.

The area planted with sugarcane up to 25th December 1938 is estimated at 96,930 acres. When compared with the corresponding estimate of 97,510 acres for the previous year and the actual area of 97,965 acres according to the Season and Crop Report, the present estimate reveals a decrease of 0·6 per cent and 1·1 per cent respectively. The estimate of the previous year fell short of the actual area by only 455 acres or 0·5 per cent.

The present estimate of area exceeds the second forecast by 6,130 acres. The excess occurs mainly in Vizagapatam, Bellary, Salem, Coimbatore and Trichinopoly.

The decrease in area in comparison with the actual area of 1937 as per Season and Crop Report occurs in all districts outside South Arcot, Salem, Coimbatore Trichinopoly, Tanjore, Madura, Ramnad and the West Coast.

The crop suffered to some extent on account of the cyclone in November in East Godavari, West Godavari, and Kistna. In parts of South Kanara the crop was affected by floods. The growth of the crop was also affected by the failure of the North-East monsoon rains in some of the other important districts.

The harvest has just commenced and yields below normal are expected in all districts outside Guntur, Bellary, Chittoor, Salem, the South Arcot and Malabar where the yield is expected to be normal. The seasonal factor for the province is calculated at 94 per cent of the average as against 99 per cent in the previous year according to the Season and Crop Report. On this basis, the yield is estimated at 261,130 tons of jaggery as against 266 630 tons estimated in January 1938 a decrease of 2 1 per cent and as against 278,820 tons, estimated in the Season and Crop Report of the previous year, the decrease in this case amounting to 6 3 per cent.

The wholesale price of jaggery per imperial maund of 82$\frac{2}{7}$ lb. (equivalent to 3,200 tolas) as reported from important markets on 23rd January 1939 was

Rs. 9-14-0 in Adoni, Rs. 7—9—0 in Chittoor, Rs. 7—4—0 in Salem, Rs. 7—1—0 in Vellore, Rs. 6—15—0 in Erode, Rs. 6—10—0 in Mangalore, Rs. 6—7—0 in Cuddalore Rs. 5—14—0 in Trichinopoly, Rs. 5—12—0 in Cocanada and Rajahmundry Rs. 5—8—0 in Vizagapatam, Rs. 4—15—0 in Bellary and Rs. 4—13—0 in Vizianagaram. When compared with the prices published in the last report, i. e., those which prevailed on 5th December 1938, these prices reveal a rise of about 29 per cent in Erode, 22 per cent in Chittoor, 20 per cent in Mangalore and 10 per cent in Vellore and a fall of about 22 per cent in Rajahmundry, 20 per cent in Vizagapatam, 12 per cent in Cocanada and 9 per cent in Trichinopoly, the prices remaining stationary in Vizianagaram, Adoni, Bellary, Cuddalore and Salem. *(Director of Industries, Madras)*

Cotton Raw. The receipts of loose cotton at presses and spinning mills in the Madras Presidency from 1st to 10th February 1939 amounted to 4,785 bales of 400 lb. lint as against an estimate of 294 2 0 bales of the total crop of 1938-39. The receipts in the corresponding period of the previous year were 6,379 bales. 8,342 bales mainly of pressed cotton were received at spinning mills and 2,987 bales were exported by sea while 6 203 bales were imported by sea mainly from Karachi and Bombay. *(Director of Agriculture, Madras).*

College News and Notes

Students' Corner. *Cricket.* On 1—2—39 a friendly match was played between C. Ramaswami's Eleven and K. M. Thomas's Eleven. C Ramaswami Eleven—204 for 7; C. Ramaswami 59, Kothandram 59, H. Shiva Rao 47, S. V. Srinivasan 4 for 60 and K. M. Thomas's Eleven, 144 for C. N. Babu 49; Kamath 35; S. V. Srinivasan 30. K M. Shetty 30; Kothandaram 3 for 62. and Hegde 2 for 27.

The Agricultural College team visited Salem on 5—2—39 and played a friendly cricket match with the Salem Gymkhana and won by 125 runs. Agricultural college 201 for 7 (C. M. Babu 80, C. Ramaswami 56, Caley 3 for 70 and Amir Pasha 3 for 7) Salem Gymkhana 76 (Nageshwara Rao 10 Sampath 14, Govindaswami 15, Dixon 13 not out; S. V. Srinivasan 1 for 26 and Kothandaram 5 for 28).

The return Match with the Salem Gymkhana was played on our grounds on 12—2—39. Agricultural College 203 for 7 (K. K. R. Menon 71, C. N. Balu 50, Kothandaram 18. K. Dinker Rao 16 not out Amir; 2 for 48, Venkataram 2 for 47 and Govindaswami 2 for 28), Salem Gymkhana 56 (Amir Pasha 12, Raghevandran 11, Govindaswami 11 not out; M. Mukundan 5 for 7, Kothandaram 2 for 7, Dinker Rao 3 for 21) and following on 54 for 4 (Govindaswami 12, Ranganada Rao 15, Nagheswara Rao 15 not out).

The following intertutorial cricket matches were played during this month,

1. A. C. Pillai's wards won against P. V. Ramiah's wards, A. C. Pillai's 51 (M. R. Nagaraj Rao 30, K. S. Ramaswami 8 for 20, V. Jayaraman 2 for 20) and 53, (N. Govindaraj 24, K. S. Ramaswami 5 for 14, V. Jayaraman, 5 for 38); P. V. Ramiah's wards 40. (K. N. Govindaraj 8 for 12) and 30 (P. S. Srinivasan 13, M. R Nagaraj 8 for 12).

C Narasimha Ayyangar's wards won against K M. Thomas' wards. C. N. Ayyangar's 126 (K. M. Shetty 77, Koulatalaya 23, Dinker Rao 4 for 45, K. M. Somanna 4 for 13) K. M. Thomas's 93; (Mr. K. M. Thomas 32, K. M. Somanna 27, Dinker Rao 13, K. M. Shetty 6 for 31).

A. C Pillai's (Mr. Kantiraj's) won against C. R. Srinivasan's M. Kantiraj's—92 (M. R Nagaraja Rao 45, T. R. Viswanath 23, Santhanam 6 for 48) C. R. Srinivasan —64 (G. Madhuram 24, Punja 11, M. K. Adeni 15).

In the finals between M. Kantiraj's and C. N. Ayyangar's the latter won the cup. C. N. Ayyangar s Wards—125 (K. M. Shetty 76, Menon 10, Kothandaram 7 for 31) M. Kantiraj's—83 (M. R. Nagaraj Rao 47, Kothandaram 12, K. M. Shetty 6 for 25, Menon 4 for 50).

Students' Club. Sri A. B. Shetty, Parliamentary Secretary to the Hon'ble Minister for Public Health, addressed a meeting of the Students' Club on the 9th of February in the Freeman Hall. Sri. Ramalingam Chettiar, M. L. C. was in the chair. Mr. Shetty speaking on Nutrition and Agriculture dwelt on the poverty of the Indian people and showed how it led to under nutrition. He was of opinion that even rich people did not know the correct principles of diet and consequently they suffered from malnutrition. This serious problem of under-nutrition should be combated, he said, by a systematic effort made to raise the standard of living of the Indian people and also by teaching them to standardise their diet in conformity with bodily requirements.

On 17-2-39 Sri. M. Bapineedu delivered a lecture at 4 P. M. under the Presidency of Mr. R. C. Broadfoot. He advised to students to take more interest in rural reconstruction and thus be of more service to the motherland.

Officers' Club. At a General body meeting of the Club on 27—1—39 the following were elected office bearers for the year 1939.

President	Sri N. L. Dutt.
Vice President	,, T. S. Ramasubramaniam.
Secretary	,, M. A. Sankara Ayyar.
Treasurer	,, S. Ramaswami Raju.
Committee Members	Mr. K. M. Thomas, Sri K. Subba Rao and C. V. Nagaraja Rao.

The Fieldmen's Association. At a general body meeting held on 3—2—39, the following office-bearers were elected for 1939.

President	Sri S. Gnanaprakasam Pillai.
Secretary	,, C. S. Narayanaswami Ayyar.
Asst. Secretary & Treasurer	,, C. K. Kuppumuthu Pillai.
Committee members.	,, D. Devasirvatham Pillai.
	,, C. R. Venkataraman.
	,, V. Narayana Ayyar.
	,, S. Kalyanasubramaniam.

Visitors. Mr. D. B. Gazdar, Plant Pathologist to the Government of Siam was at Coimbatore from 20th to 23rd January.

Sri. A. B. Shetty, Parliamentary Secretary to the Hon'ble Minister for Public Health visited the College and Research Institute on 9—2—39.

Sri. Bapineedu, Parliamentary Secretary to the Minister for Public Information visited the Research Institute and the College on 17—2—39.

The Agricultural College Bhajana Association. With the object of making the Bhajana celebrations a permanent feature, the above Association was formed by the Bhajana devotees of the Estate. The "Radhakalyanam" was celebrated as usual this year on 1—2—39 with great eclat.

Weather Review—JANUARY 1939.

RAINFALL DATA

Division	Station	Actual for month	Departure from normal @	Total since January 1st	Division	Station	Actual for month	Departure from normal @	Total since January 1st
Circars	Gopalpore	0·0	−0·2	0·0	South	Negapatam	1·4	−0·3	1·4
	Calingapatam	0·2	−0·1	0·2		Aduthurai *	2·4	−0·3	2·4
	Vizagapatam	0·0	−0·5	0·0		Madura	0·9	+0·3	0·9
	Anakapalli *	0·2	−0·1	0·2		Pamban	1·8	−0·3	1·8
	Samalkota *					Koilpatti *	1·9	+0·5	1·9
	Maruteru *	0·2	+0·1	0·2		Palamkottah	2·1	+0·6	2·1
	Cocanada	0·2	0·0	0·2					
	Masulipatam	0·0	−0·2	0·0					
	Guntur *	0·0	0·0	0·0	West Coast	Trivandrum	0·5	−0·2	0·5
						Cochin	0·0	−0·7	0·0
Ceded Dists.	Kurnool	0·0	−0·2	0·0		Calicut	0·1	−0·3	0·1
	Nandyal *	0·0	0·0	0·0		Pattambi *	0·0	−0·2	0·0
	Hagari *	0·0	0·0	0·0		Taliparamba *			
	Siruguppa *	0·0	−0·1	0·0		Kasargode *	0·0	−0·2	0·0
	Bellary	0·0	−0·1	0·0		Nileshwar *	0·0	−0·2	0·0
	Anantapur	0·0	−0·4	0·0		Mangalore	0·0	−0·1	0·0
	Rentachintala	0·0	...	0·0					
	Cuddapah	0·1	−0·3	0·1					
	Anantharajupet *	2·94	+2·79	2·94	Mysore and Coorg	Chitaldrug	0·0	−0·3	0·0
						Bangalore	0·6	+0·5	0·6
Carnatic	Nellore	1·0	−0·7	1·0		Mysore	0·3	+0·1	0·3
	Madras	0·7	−0·7	0·7		Mercara	0·9	+0·8	0·9
	Palur *	0·0	0·0	0·0					
	Tindivanam *	0·7	−0·7	0·7	Hills	Kodaikanal	3·7	+0·8	3·7
	Cuddalore	3·5	+1·4	3·5		Coonoor			
Central	Vellore	2·0	+0·5	2·0		Ootacamund *	1·3	−2·9	1·3
	Salem	0·6	+0·3	0·6		Nanjanad *	0·6	−0·6	0·6
	Coimbatore	2·3	+1·7	2·3					
	Coimbatore A. C. & R. I. *	2·1	+1·4	2·1					
	Trichinopoly	1·9	+1·2	1·9					

* Meteorological Stations of the Madras Agricultural Department.

@ From average rainfall for the month calculated upto 1935 published in the Fort St. George Gazette.

Conditions were unsettled in the south of the bay about the 7th and a cyclonic storm formed there, but weakened, and became unimportant by the 11th. This caused local rains till the 15th in Southeast Madras, North Madras Coast and Malabar. Local rains were also recorded in Madras and extreme south of Peninsula on the 19th, 20th, 24th and 25th. Except for the above rainfall dry weather prevailed in the Peninsula.

Skies were lightly to moderately clouded in the Madras Presidency. During most of the days humidity was in defect.

Maximum and minimum temperatures were generally above normal.

Weather Report for Research Institute Observatory.

Report No. 1/39.

Absolute Maximum in shade.	...	88°F.
Absolute Minimum in shade.	...	56·9°F.

Mean Maximum in shade.	...	84·3°F.
Departure from normal.	...	– 1·6°F.
Mean minimum in shade.	...	62·9°F.
Departure from normal.	...	– 1·3°F.
Total rainfall.	...	2·14″.
Departure from normal.	...	+ 1·44″.
Heaviest rainfall in 24 hours.	...	1·89″ on 12th.
Total number of rainy days.	...	2
Mean daily wind velocity.	...	2·8 m. p. h.
Mean Humidity.	...	77 %
Departure from normal.		0·8 %

The weather was fine throughout the month. The skies were lightly to moderately clouded and a fall of 1·89″ occurred on the 12th. The day and night temperatures were below normal.

P. V. R. & T. C.

Departmental Notifications.

Gazette Notification.

Name of officers.	From	To
Mr. C. M. John,	Temporary Superintendet, A. R. S., Tindivanam	Offg. Oil Seeds Specialist, Coimbatore.
Sri C. R. Seshadri,	Asst., Oil Seeds Section, Tindivanam,	Temporary Supdt., A. R. S., Tindivanam,

Transfers.

Name of officers.	From	To
Sri P. S. Narayanaswami Ayyar,	Cotton Section, Coimbatore.	Asst., Entomology Section, Coimbatore.
„ P. N. Muthuswami,	Offg. F. M., A. R. S., Siruguppa,	Offg. A. D., Ginjee.
Janab Khadir Razak Sahib,	Offg. A. D., Proddatur,	Offg. F. M., A. R. S., Siruguppa.

Leave.

Name of officers.	Period of leave.
Sri. P. S. Krishnamurthy, Entomology Asst., Bellary.	L. a. p. for 20 days from 20-2-39.
„ S. G. Aiyadurai, Asst. in Oil Seeds, Coimbatore.	L a. p. for 31 days from 6-3-39.
„ M. Subramania Chetty, A. R. S., Guntur.	L. a. p. on m. c. for 30 days from 6-2-39.
„ G. Sitarama Sastri, A. D., Repalli.	L. a. p. for 30 days from 27-2-39.
„ S. Venkatarama Ayyar, A. D., Mannargudi.	L. a. p. for 21 days from 20-1-39.
„ S. Rama Rao, A. D. Hospet.	L. a. p. for 1 month from 12-1-39.
„ S. Ramachandran, Asst. in Entomology, Coimbatore	L. a. p. for 4 months from 30-1-39.

Sri. N. H. V. Krishnamurthy, F. M., A. R. S., Anakapalle.	Earned leave for 15 days from 10-1-39.
„ S. M. Kalyanaraman, Asst. Cotton Section, Coimbatore.	L. a. p. for 6 weeks from 6-2-39.
„ T. V. Krishnaswami Rao, A. D., Sompeta	Extension of l. a. p. for 26 days from 3-2-39.
„ R. G. Mal, A. D. (on leave).	Extension of leave on half-average pay for 4 months from 9-2-39.
„ P. V. Hanumantha Rao, A. D., Koilpatti.	L. a. p. for 3 months from the date of relief.
„ K. E. Viswam Aiyar, A. D., Tiruvannamalai.	L. a. p. on m. c. for 1 month from 28-1-39.
„ A. M. Muthayya Nattar, A. D. (on leave).	Extension of l. a. p. on m. c. for 45 days from 8-1-39.
„ P. Gopalakrishnan, F. M., A. R. S., Nanjanad.	L. a. p. for 1 month from 8-1-39.
„ C. V. Sundaram, Asst. in Entomology, Coimbatore.	L. a. p. for 3 weeks from 8-2-39.
„ P. Ramanadha Rao, A. D., Atmakur.	L. a. p. on m. c. for 28 days from 31-1-39.
„ S. Venkataswami, A. D., Mannargudi.	L. a. p. for 3 weeks from 20-1-39.
„ K. V. Shenai, A. D., Coondapur.	L. a. p. for 1 month from 11-1-39.
„ F. L. Daniel, Offg. Asst. in Chemistry, Coimbatore.	Extension of earned leave on average pay for 30 days from 6-2-39.

Agricultural College and Research Institute, Coimbatore.

Additions to the Library during January 1939.

A. Books.

1. *Report on Agricultural Research in Great Britain.* Eng. P. E. P. Report. (1938). 2. *Silage and Crop Preservation.* Watson, S. J. (1938). 3. *Planning and Planting your own Place.* Van De Boe, L. (1938). 4. *Our Shade Trees.* Felt, E. P. (1938). 5. *Principles of Tree and Small Fruit Culture.* Kelley, V. W. (1937). 6. *Weeds of Grass Land.* Long, H. S. (1938). 7. *Land Utilization in China.* Buck, J. L. (1937). 8. *Trends of Agriculture and Population in Ganges Valley.* Birendranath Ganguli. (1938). 9. *Part time Farming in the South East (U. S. A.) Works—Progress Administration—Social Research Monograph No 9.* (1937). 10. *Introduction to the Botany of Field Crops 2 Vols.* Hector, A. M. (1936). 11. *The structure of Economic Plants.* Hayward, H. E. (1938). 12. *Plant Physiology 2nd Revised Edn.* Maximov, N. A. (1938).

B. Administration Reports.

1. Administration Report of the Agricultural Department of Madras Presidency for 1937-38. 2. Agricultural Stations report of the Department of Agriculture, Burma for the year ending 31st March 1938. 3. Indian Central Cotton

Committee, Bombay, Proceedings of the meeting held on 12th and 13th July 1938. 4. Annual Report of the Field Experiments on Sugarcane in Trinidad, 1938. 5. Annual Bulletin of Divisional Reports of Fiji, 1937. 6. Cyprus Annual Report of the Department of Agriculture for 1937. 7. British Honduras Annual Report of the Department of Agriculture for 1937. 8. St. Kitts-Nevis, Report of the Agricultural Department for 1937. 9. St. Vincent, Report of the Agricultural Department for 1937. 10. Jamaica, Annual Report of the Department of Agriculture for 1937. 11. Seychelles Annual Report of the Department of Agriculture for 1937. 12. Report of the Minister of Agriculture for the Dominion of Canada, 1937. 13. Progress Report of Apiarist, Bee Division for years 1934 to 1936. 14. Texas Annual Report for 1936. 15. Annual Report of the International Crop Improvement Association 1937.

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